CLAIMS:

1. An optical substrate comprising:

at least one surface, said at least one surface comprising at least one optical structure having a shape and dimensions, wherein the shape and dimensions of each optical structure represents in part a modulation of a corresponding idealized structure, and wherein said shape and dimensions of each of said at least one optical structure is determined in part by at least one randomly generated component of modulation wherein the modulation of each of said at least one optical structure is limited by a neighboring optical structure comprised by the surface.

2. An optical substrate according to claim 1 wherein said at least one optical structure represents an idealized prismatic structure following a surface path modulated by a mathematical function (1)

$$y_i = A_i \sin\{\phi\lambda - \Phi_i\} + S_i \qquad (1)$$

defined relative to a segment C of a coordinate system, wherein i is an integer indicative of the i^{th} surface path, y_i is an instantaneous displacement of the path relative to C on the i^{th} path, A_i is an amplitude scaling factor of the i^{th} path relative to C, S_i is a shift in a starting position of y_i, ϕ is a number between zero and 2π inclusive, λ is a wavelength which is a real number, Φ_i is a phase component for the i^{th} path, wherein

$$\Phi_i = \Phi_{i-1} + Q_i\Delta + R_i\delta \qquad (2)$$

where Q_i is a randomly or pseudo randomly chosen number having a value of 1 or -1, R_i is a continuous random variable between -1 and 1, each defined for the i^{th} path, and Δ and δ are real numbers that define a magnitude of a phase stepping component and a magnitude of a phase dither component, respectively.

3. An optical substrate according to claim 1 wherein said at least one optical structure represents an idealized prismatic structure following a surface path modulated by a mathematical function (3a)

$$y_i = \sum_{k=1}^{n} A_{i,k} \sin\{\phi\lambda_k - \Phi_{i,k}\} + S_i \qquad (3a)$$

defined relative to a segment C of a coordinate system, wherein i is an integer indicative of the i^{th} surface path, y_i is an instantaneous displacement of the path relative to C on the i^{th} path,

$A_{i,k}$ is the k^{th} amplitude scaling factor of the i^{th} path relative to C, S_i is a shift in a starting position of y_i, ϕ is a number between zero and 2π inclusive, n is an integer greater than 1, each wavelength λ_k is a real number, $\Phi_{i,k}$ is the k^{th} phase component of the i^{th} path, wherein

$$\Phi_{i,k} = \Phi_{i-1,k} + Q_{i,k}\ \Delta + R_{i,k}\delta \qquad (3b)$$

$Q_{i,k}$ is the k^{th} randomly or pseudo randomly chosen number having a value of 1 or −1 for the i^{th} path, $R_{i,k}$ is the k^{th} continuous random variable having a value between −1 and 1 for the i^{th} path, and Δ and δ are real numbers that define a magnitude of a phase stepping component and a magnitude of a phase dither component, respectively.

4. An optical substrate according to claim 1 wherein said at least one optical structure represents an idealized prismatic structure following a surface path modulated by a mathematical function (4a)

$$y_i = \sum_{k=1}^{n} A_{i,k}\, f\ \{\phi\lambda_k - \Phi_{i,k}\} + S_i \qquad (4a)$$

wherein f is a periodic function defined relative to a segment C of a coordinate system, wherein i is an integer indicative of the i^{th} surface path, y_i is an instantaneous displacement of the path relative to C on the i^{th} path, $A_{i,k}$ is the k^{th} amplitude scaling factor of the i^{th} path relative to C, S_i is a shift in a starting position of y_i, ϕ is a number between zero and 2π inclusive, n is an integer greater than 1, each wavelength λ_k is a real number, $\Phi_{i,k}$ is the k^{th} phase component of the i^{th} path, wherein

$$\Phi_{i,k} = \Phi_{i-1,k} + Q_{i,k}\ \Delta + R_{i,k}\delta \qquad (4b)$$

$Q_{i,k}$ is the k^{th} randomly or pseudo randomly chosen number having a value of 1 or −1 for the i^{th} path, $R_{i,k}$ is the k^{th} continuous random variable having a value between −1 and 1 for the i^{th} path, and Δ and δ are real numbers that define a magnitude of a phase stepping component and a magnitude of a phase dither component, respectively.

5. The substrate of claim 3 where $0 \leq \Delta < (0.95\ \pi)$ radians.

6. The substrate of claim 3 where $0 \leq \delta < (0.5\ \pi)$ radians.

7. The substrate of claim 3 where $0 \leq \Delta < (0.95\ \pi)$ radians and $0 \leq \delta < (0.5\ \pi)$ radians.

8. An optical substrate according to claim 1 wherein said at least one optical structure represents an idealized prismatic structure following a surface path modulated by a mathematical function

$$y_i = A_i\left[(1-m)\, r_i(\phi) + m\ r_{i-1}(\phi)\right] + S_i$$

wherein i and i-1 are indicative of an i^{th} and a $(i-1)^{th}$ path, respectively, the i^{th} and the $(i-1)^{th}$ paths being adjacent paths, the i^{th} and the $(i-1)^{th}$ path amplitudes being mixed, wherein part of a random vector for y_{i-1} is added to y_i for the i^{th} path, wherein $r_i(\phi)$ is a band-limited random or pseudo random function of ϕ for each i^{th} path, $r_i(\phi)$ has a continuously varying value between -1 and 1;

ϕ is 0 to 2π inclusive;

m is a scalar mixing parameter with a value between 0 and 1;

A_i is an amplitude scaling parameter; and

S_i is a shift in a starting position of y_i.

9. The optical substrate of claim 1, wherein the optical substrate comprises an optically transparent film having a second surface opposite to the first surface, the second surface being smooth.

10. The optical substrate of claim 2, wherein the optical substrate comprises an optically transparent film having a second surface opposite to the first surface, the second surface being smooth.

11. The optical substrate of claim 3, wherein the optical substrate comprises an optically transparent film having a second surface opposite to the first surface, the second surface being smooth.

12. The optical substrate of claim 4, wherein the function f is selected from the group of mathematical functions consisting of triangular function, sawtooth function and square wave function.

13. A backlight display device comprising:

a light source for generating light;

a light guide for guiding the light therealong including a reflective surface for reflecting the light out of the light guide; and

an optical film comprising:

at least one surface, said at least one surface comprising at least one optical structure having a shape and dimensions, wherein the shape and dimensions of each optical structure represents in part a modulation of a corresponding idealized structure, and wherein said shape and dimensions of each of said at least one optical structure is determined in part by at least one randomly generated component of modulation wherein the modulation of each of said at least one optical structure is limited by a neighboring optical structure comprised by the surface.

14. The backlight display device of in claim 13 wherein said at least one optical structure represents an idealized prismatic structure following a surface path modulated by a mathematical function (1)

$$y_i = A_i \sin\{\phi\lambda - \Phi_i\} + S_i \qquad (1)$$

defined relative to a segment C of a coordinate system, wherein i is an integer indicative of the i^{th} surface path, y_i is an instantaneous displacement of the path relative to C on the i^{th} path, A_i is an amplitude scaling factor of the i^{th} path relative to C, S_i is a shift in a starting position of y_i, ϕ is a number between zero and 2π inclusive, λ is a wavelength which is a real number, Φ_i is a phase component for the i^{th} path, wherein

$$\Phi_i = \Phi_{i-1} + Q_i\Delta + R_i\delta \qquad (2)$$

where Q_i is a randomly or pseudo randomly chosen number having a value of 1 or -1 R_i is a continuous random variable between -1 and 1, each defined for the i^{th} path, and Δ and δ are real numbers that define a magnitude of a phase stepping component and a magnitude of a phase dither component, respectively.

15. The backlight display device of claim 13 wherein said at least one optical structure represents an idealized prismatic structure following a surface path modulated by a mathematical function (3a)

$$y_i = \sum_{k=1}^{n} A_{i,k} \sin\{\phi\lambda_k - \Phi_{i,k}\} + S_i \qquad (3a)$$

defined relative to a segment C of a coordinate system, wherein i is an integer indicative of the i^{th} surface path, y_i is an instantaneous displacement of the path relative to C on the i^{th} path, $A_{i,k}$ is the k^{th} amplitude scaling factor of the i^{th} path relative to C, S_i is a shift in a starting position of y_i, ϕ is a number between zero and 2π inclusive, n is an integer greater than 1, each wavelength λ_k is a real number, $\Phi_{i,k}$ is the k^{th} phase component of the i^{th} path, wherein

$$\Phi_{i,k} = \Phi_{i-1,k} + Q_{i,k}\,\Delta + R_{i,k}\delta \qquad (3b)$$

$Q_{i,k}$ is the k^{th} randomly or pseudo randomly chosen number having a value of 1 or -1 for the i^{th} path, $R_{i,k}$ is the k^{th} continuous random variable having a value between -1 and 1 for the i^{th} path, and Δ and δ are real numbers that define a magnitude of a phase stepping component and a magnitude of a phase dither component, respectively.

16. The backlight display device of claim 13 wherein said at least one optical structure represents an idealized prismatic structure following a surface path modulated by a mathematical function

$$y_i = A_i\left[(1-m)\, r_i(\phi) + m\ \ r_{i-1}(\phi)\right] + S_i$$

wherein i and i-1 are indicative of an i^{th} and a $(i-1)^{th}$ path, respectively, the i^{th} and the $(i-1)^{th}$ paths being adjacent paths, the i^{th} and the $(i-1)^{th}$ path amplitudes being mixed, wherein part of a random vector for y_{i-1} is added to y_i for the i^{th} path, wherein $r_i(\phi)$ is a band-limited random or pseudo random function of ϕ for each i^{th} path, $r_i(\phi)$ has a continuously varying value between -1 and 1;

ϕ is 0 to 2π inclusive;

m is a scalar mixing parameter with a value between 0 and 1;

A_i is an amplitude scaling parameter; and

S_i is a shift in a starting position of y_i.

17. The backlight display device of claim 15 wherein $S_i - S_{i-1}$ is in the range of 5 μm to 200 μm.

18. The backlight display device of claim 15 wherein the prismatic structure has an apex angle of between 20 degrees and 160 degrees.